REMARKS

The Applicant first thanks the Examiner for indicating that claim 20 is objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. In accordance with this indication, the subject matter of claims 1, 15, 19 and 20 is appropriately revised and rewritten as new independent claim 48 and this newly entered independent claim is believed to be allowable.

Claims 17 and 18 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for the reasons noted in the official action. The subject matter of the rejected claims are accordingly revised and rewritten as new claims 26-49 and all of the presently pending claims are now believed to particularly point out and distinctly claim the subject matter regarded as the invention, thereby overcoming all of the raised § 112, second paragraph, rejections. Such entered claim amendments are directed solely at overcoming the raised indefiniteness rejection(s) and are not directed at distinguishing the present invention from the art of record in this case.

Claims 1-4, 7, 9-15 and 22-25 are rejected, under 35 U.S.C. § 102(b), as being anticipated by DeGregoria et al. `424 (U.S. Patent No. 5,249,424). The Applicant acknowledges and respectfully traverses the raised anticipatory rejection in view of the following remarks.

It is first noted that the features of claims 5 and 6 are not rejected in view of DeGregoria et al. `424. In view of this, the subject matter of claims 1, 3, 5 and 6 are substantially combined with one another and rewritten as new independent 26 and this new claim is believed to adequately distinguish over DeGregoria et al. `424. In addition, new independent 49 is entered and this new independent claim recites subject matter similar to claim 26 but eliminates the means plus function terminology.

With respect to the applied art, DeGregoria et al. `424 relates to a magnetic regenerator method and apparatus. The apparatus includes a number of active magnetic regenerator (AMR) beds, a number of magnets, a system of conduits, heat exchangers and a pump or a displacer with a piston. The pump or the displacer causes the heat transfer fluid to flow through

the AMR beds. Depending on the proximity of the magnets, the temperature of the AMR bed will either increase or decrease. As the heat transfer fluid flows through the AMR beds, the temperature of the heat transfer fluid will also either increase or decrease. The heat transfer fluid then flows through the heat exchangers where heat is either drawn away from or drawn into the heat transfer fluid depending on the direction of flow of the heat transfer fluid and the relative difference between the temperatures of the heat transfer fluid and the environment in which the heat exchangers are located. In view of such disclosure, it is respectfully submitted that there are a number of distinctions between the apparatus of DeGregoria et al. `424 and the presently claimed invention.

For example, it should be noted that the apparatus of DeGregoria et al. `424 teaches a single system of conduits which connect each of the AMR beds in series such that the heat transfer fluid flows through each of the AMR beds. Depending on the direction of flow of the heat transfer fluid through the single system of conduits, the heat exchangers can either draw heat away from or draw heat into the fluid. Fig. 3 of DeGregoria et al. `424 shows the heat transfer fluid flowing in a first direction through the system of conduits while Fig. 4 shows the heat transfer fluid flowing in the opposite direction.

The presently claimed invention includes at least two independent circuits, that is, a hot circuit 410a and a cold circuit 410b. These two circuits 410a and 410b direct heat exchange fluid through one of the two thermal bodies 41a or 41b and one heat extracting means 413a or 413b at a time. The circuit 410a or 410b, through which the heat exchange fluid flows, depends on a commutation means 412. The commutation means 412 alternately directs the heat exchange fluid through one of the circuits 410a or 410b depending on the location of magnetic means with respect to the thermal bodies 41a or 41b. A synchronization means synchronizes the locations of the magnetic means and the thermal bodies with the commutation means 412, such that calories are recuperated from the hot circuit 410a and figories are recuperated from the cold circuit 410b.

In view of the above distinctions, it is respectfully submitted that DeGregoria et al. `424 fails to render anticipate new independent claims 26 and 49 and the raised rejection, in view of DeGregoria et al. `424, should be withdrawn at this time.

Next, claims 5, 6, 8, 12-14, 16-19 and 21 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over DeGregoria et al `424 in view of Zimm et al. `560 (U.S. Patent No. 6,668,560). The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

Zimm et al. `560 relates to a rotating magnet magnetic refrigerator comprising stationary compartments 13 containing magneto-caloric material 12 and magnets 40 driven around these compartments 13 to produce a cyclic variation in the strength of the magnetic field in each compartment 13.

Each compartment 13 has a cold side 15 and a hot side 16 and the magneto-caloric material therein is porous thus enabling a heat transfer fluid to flow there through. The cold side 15 is provided with a pair of fluid access ports, a cold side inlet port 22 connected to a cold side inlet pipe 21 and to a cold side outlet port 24 connected to a cold side outlet pipe 23. The hot side 16 is provided with a pair of fluid access ports, a hot side inlet port 32 connected to a hot side inlet pipe 31 and to a hot side outlet port 34 connected to a hot side outlet pipe 33 (see column 3, lines 37-51).

Depending on the strength of the magnetic field of the magnets 40 as they pass the compartments 13 together with the intervention of a number of valves 71-74, these pipes 21, 23, 31, 33 either transfer, or do not transfer, the heat transfer fluid through the compartments 13 in such a way that:

1. the heat transfer fluid circulating in compartments 13 situated in regions 50 with a high magnetic field, is warmed by the magneto-caloric material inside these compartments 13 and is then directed to a hot heat exchanger 62 where heat is passed to the environment;

2. the heat transfer fluid then leaves the hot heat exchanger 62 and circulates in the compartments 13 situated in regions 51 with a low magnetic field, and is cooled by the magneto-caloric material inside these compartments 13 and is then directed to a cold heat exchanger 63 where the thermal load is cooled; and

3. the compartments 13, which are situated in regions 52 with an intermediate level of magnetic field, are not connected to the circuit and no heat transfer fluid is circulating inside them (see column 4, lines 8-13).

As such, it is respectfully submitted that Zimm et al. `560 does not in any way teach, suggest disclose or remotely hint at *independent hot and cold circuits*, as presently claimed, but instead teaches *one closed circuit* containing a cold heat exchanger 63 and a hot heat exchanger 62, both being interconnected through compartments 13 situated in regions 50 and 51. Such arrangement is in distinct contrast to the presently claimed invention.

Moreover, it is respectfully submitted that each compartment 13 is not, at each cycle, connected to a hot circuit or to a cold circuit in a manner claimed by the presently pending claims. Instead the compartment 13 is, at each time, either:

1. integrated into the circuit such that the heat transfer fluid circulates there through in the direction of the hot heat exchanger 62, or

2. integrated into the circuit such that the heat transfer fluid circulates there through in the direction of the cold heat exchanger 63 or,

3. not integrated into the circuit at all.

In view of the above, it is respectfully submitted that the construction of the refrigerator, as taught by Zimm et al. `560, is such that the flow of the heat transfer fluid through pipes 21, 23, 31, 33 is either in a unique direction, or does not flow at all (see column 4, lines 62-65), so as to minimize the dead volume effect in the heat exchangers or between the magneto-caloric material and the heat exchangers (see column 2, line 65-column 3, line 2). As such, it is respectfully submitted that the teachings, suggestions, disclosures and hints of Zimm et al. `560 are distinct different from the presently claimed invention.

In further distinction, the design, operation and control of the refrigerator as taught by Zimm et al. `560 requires more than two operating positions (see paragraph 13 in the description in which the prior art of WO03/050456 corresponds to Zimm et al. `560).

In order to emphasize the above noted distinctions between the presently claimed invention and the applied art, the independent claims 26 and 49 now recite the features of the recuperation means comprises at least two heat transfer fluid circuits (410a, 410b).... at least one of the at least two circuits (410a, 410b) being a hot circuit (410a) for the calories and at least one of the at least two circuits (410a, 410b) being a cold circuit (410b) for the frigories, and a commutation means (412) for connecting each of the at least two transfer zones (14) in alternation to one of the at least two circuits (410a, 410b), and a synchronization means for synchronizing the reciprocating displacement means with the commutation means (412) such that, depending on the magnetic field to which each magneto-caloric element (12, 22, 32) is subjected, the corresponding transfer zone (14) being connected to one or other of the at least two circuits (410a, 410b). Such features are believed to clearly and patentably distinguish the presently claimed invention from all of the art of record, including the applied art.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejections or applicability of the DeGregoria et al. `424 and/or Zimm et al. `560 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejections should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case. In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,

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